Early childhood sexual abuse increases suicidal intent

Jorge Lopez-Castroman[1], Nadine Melhem[2], Boris Birmaher[2], Laurence Greenhill[3], David Kolko[2], Barbara Stanley[3], Jamie Zelazny[2], Beth Brodsky[3], Rebeca Garcia-Nieto[1], Ainsley K. Burke[4], J. John Mann[4], David A. Brent[2], Maria A. Oquendo[3,4]

[1]IIS-Fundacion Jimenez Diaz, Department of Psychiatry, CIBERSAM, Madrid, Spain; [2]Department of Psychiatry, Western Psychiatric Institute and Clinic, University of Pittsburgh Medical Center, Pittsburgh, PA, USA; [3]Department of Psychiatry, Columbia University/New York State Psychiatric Institute, New York, NY, USA; [4]Department of Neuroscience, Columbia University/New York State Psychiatric Institute, New York, NY, USA

Childhood sexual abuse has been consistently associated with suicidal behavior. We studied suicide attempt features in depressed individuals sexually abused as children. On average, sexual abuse started before age 9. It frequently coexisted with physical abuse. Suicide attempters more often had personality disorders and had endured abuse for longer, but did not differ in terms of other clinical characteristics from non-attempters. Earlier onset of sexual abuse and its duration were associated with more suicide attempts. However, when personality disorders were included in the regression model, only these disorders predicted number of attempts. The severity of sexual abuse and the coexistence of physical abuse were correlated with age at first suicide attempt. However, only severity of sexual abuse was marginally associated with age at first suicide attempt in the regression model. Finally, the earlier the age of onset of sexual abuse, the higher the intent, even after controlling for age, sex and personality disorders. This suggests that the characteristics of childhood sexual abuse, especially age of onset, should be considered when studying the risk for suicidal behavior in abused populations.

Key words: Suicide, suicidal features, early trauma, life events

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Childhood abuse is unfortunately a common problem. In 2008, an estimated 772,000 children in the US were victims of maltreatment, with 120,000 substantiated cases of physical abuse and 70,000 of sexual abuse (1). The lifetime prevalence rate of physical abuse according to the National Comorbidity Survey is estimated at 16.5% (with 62.5% of the reports concerning females) (2), whereas a recent meta-analysis of studies in non-clinical samples has estimated a lifetime prevalence of sexual abuse of 19.2% among females and 7.9% among males (3).

Sexual abuse and, to a lesser extent, physical abuse in childhood have both been consistently associated with suicidal behavior (4–6). Indeed, those reporting any traumatic experience in childhood show a 2 to 5-fold higher risk of being suicide attempters compared to those who do not (5), with the relationship of suicide attempt with childhood physical or sexual abuse being stronger than that with verbal abuse and molestation (7). More physically painful abuse may also relate to a greater number of later suicide attempts than less painful abuse (7). Repeated abuse, compared to single episodes of abuse, or abuse by a member of immediate family may also heighten risk for attempting suicide in later life (8).

Recent work suggests that abuse may be especially damaging when it occurs at a very young age, with high levels of depression being more frequent among children abused in the first five years of life (9). However, to our knowledge, there are no studies examining the relationship between the age at onset of abuse and the risk for suicidal behavior in later life.

We studied the features of suicide attempts in a sample of depressed individuals who had been abused as children. We hypothesized that a greater risk of attempted suicide is associated with childhood sexual abuse rather than physical abuse, and that measures of severity of the suicidal behavior, such as higher number of suicidal attempts, younger age at first suicide attempt, greater lethality of the attempts and more serious suicidal intent, are related to earlier age at onset of abuse. Given their well-established role in the risk for suicidal behavior (10–12), we controlled for sex, age and personality disorders.

METHODS

Study participants

The initial sample consisted of 288 depressed adult subjects recruited at the inpatient and outpatient units of two university clinics, the Western Psychiatric Institute and Clinic in Pittsburgh (n=188) and the New York Psychiatric Institute (NYSPI, n=100), as part of a larger study (13). To obtain accurate information on the abuse, we selected 222 subjects who had completed the Childhood and Adolescence Review of Experiences (CARE) (14). Because sexual, but not physical, abuse was significantly associated with attempting suicide (X^2=4.439; df=1; p=0.035 and X^2=0.145; df=1; p=0.704, respectively), we further analyzed only individuals who had been sexually abused (n=103). Those with physical abuse, but no sexual abuse, were excluded. All participants gave written informed consent as required by the Institutional Review Board of the University of Pittsburgh, St. Francis Medical Center, and the NYSPI.

The average age in the sample was 40.3±7.9 years (range: 23 to 60 years), and 93.2% of subjects were female (n=96). The mean total number of years of education was 14.0±2.9 (range: 9 to 24 years). Most subjects were either separated/divorced (n=41; 39.8%) or married (n=38; 36.9%).

Regarding ethnicity, 60.2% of subjects were White (n=80), 27.8% were African American (n=37), 0.8% were Asian (n=1), and 3.0% were more than one race (n=4). Race was missing for 11 subjects, most of them being of Hispanic origin (10/11). In total, 9.0% of the subjects were Hispanic (n=12).

Primary lifetime Axis I diagnoses were major depression (86.4%, n=89) and bipolar disorder (13.6%, n=14). Secondary lifetime diagnoses were anxiety disorders excluding post-traumatic stress disorder (PTSD) (54.4%, n=56), PTSD (42.7%, n=44), and dysthymia (12.6%, n=13). Regarding Axis II diagnoses, 38.8% of subjects (n=40) met criteria for a personality disorder, with borderline personality disorder being the most frequently diagnosed (25.2%, n=26). With regard to substance use, 45.6% of subjects (n=47) reported alcohol use, 17.5% (n=18) reported using cocaine, 23.3% (n=24) reported using cannabis, and 58.3% (n=60) reported the use of at least one substance.

Assessment

All subjects were assessed for the presence of lifetime and current DSM-IV psychiatric disorders using the Structured Clinical Interview for DSM-IV (SCID-I) (15). Personality disorders were diagnosed using the Axis II Structured Clinical Interview (SCID-II) (16). Depression severity was assessed with the Hamilton Rating Scale for Depression (HAM-17) (17). Suicidal behavior was assessed using the Columbia University Suicide History Form (10), the Medical Damage Lethality Rating Scale (12), and the Beck Suicide Intent Scale (18).

The operational definitions of childhood physical and sexual abuse were based on a previous study by our group (19). Master level clinicians or clinical psychologists carried out the evaluation. MD or PhD level clinicians subsequently confirmed the assessment in consensus meetings. In all subjects, history of childhood physical and sexual abuse was assessed with a series of screening questions in the demographic questionnaire and the CARE. Screening questions asked: a) for any history of physical and/or sexual abuse over lifetime; b) if yes, whether the abuse was physical, sexual, or both; and c) if yes, whether the abuse took place before age 15 years. The CARE is an interview focusing on early childhood adverse experiences. It retrospectively assesses the presence or absence of physical and/or sexual abuse, age at onset, severity, duration, and perpetrator of abuse between the ages of 8 and 18 years. In the assessment of sexual abuse, there was 86.5% agreement between the CARE and the screening questions (192/222; κ=0.73, 95%CI = 0.63-0.81). Severity of the abuse was the maximal score in any sexual abuse episode according to the CARE scale. Duration of abuse was the maximal length in any episode of sexual abuse according to the data of the CARE. Age at onset of abuse was the earliest age at which the patient endorsed having suffered sexual abuse.

To assess impulsivity/aggression trait measures, participants were administered the Brown-Goodwin Aggression Inventory (20), the Barratt Impulsivity Scale (BIS) (21), and the Buss-Durkee Hostility Inventory (22).

The role of the abuser was categorized in two groups: a) primary caretaker at home (sibling, parent, step-parent, close relative) or non-custodial parent; b) stranger (including acquaintance, babysitter, neighbor and other adult living out of the home). For individuals who suffered abuse from different persons, we considered the person who inflicted the most severe abuse as the main abuser.

Statistical analyses

Chi-square analyses were used to explore the association of ever attempting suicide with reported physical or sexual abuse. In the subsample of sexually abused subjects, attempters versus non-attempters were compared on demographic and diagnostic variables and features of the abuse using chi-square analyses and analyses of variance. Bivariate correlations were conducted within the sample of sexually abused suicide attempters. We used Pearson correlation to examine the association between response variables measuring the severity of the suicidal behavior (number of suicide attempts, lethality of suicide attempt, age at first suicide attempt, and level of suicidal intent) and the characteristics of the abuse (age at onset of the abuse, concurrent physical abuse, role of the abuser, severity of the abuse, duration of the abuse and repetition of abuse episodes).

Linear regression models were developed including the characteristics of abuse that significantly correlated with the response variables. Both main effects and interactions were tested, but no significant interactions were detected. The significance level was set at α=0.05 (2-sided). Personality disorders, sex and age were introduced in the regression models as covariates to control for their association with the characteristics of the suicide attempts (age at first attempt was adjusted for personality disorders and sex only). Correlation and regression analyses were repeated including only females (93.2%), but the overall results were similar with and without males, so results are shown only with regards to the total sample.

RESULTS

Description of the sample

Among those who were sexually abused, suicide attempters and non-attempters did not differ in terms of race, age, or other socio-demographic variables (Table 1). Regarding lifetime diagnoses, suicide attempters were more likely to be diagnosed with personality disorders (X^2=16.32; df=1; p<0.001), particularly borderline personality disorder (X^2=15.4; df=1; p<0.001). No differences were found

Table 1 Socio-demographic, clinical and historical variables in sexually abused suicide attempters and non-attempters

	Attempters (n=57)	Non-attempters (N=46)	Test results (df=1)	p
Age (years, mean±SD)	40.1 ± 8.9	40.6 ± 6.7	F=0.92	0.763
Sex (% males)	7.0	6.5	X^2=0.01	0.921
Education (years, mean±SD)	14.0 ± 2.9	14.0 ± 2.8	F=0.001	0.981
Race (% non-Hispanic White)	53.6	65.2	X^2=1.41	0.234
Married (%)	33.3	41.3	X^2=0.69	0.405
Major depression lifetime diagnosis (%)	80.7	93.5	X^2=3.54	0.060
Bipolar disorder lifetime diagnosis (%)	19.3	6.5		
PTSD lifetime diagnosis (%)	47.4	37.0	X^2=1.13	0.288
Personality disorder diagnosis (%)	59.3	18.6	X^2=16.32	0.000
Borderline personality disorder diagnosis (%)	42.6	7.0	X^2=15.48	0.000
Substance use (%)	61.4	54.3	X^2=0.52	0.470
HAM-D score (mean±SD)	13.5 ± 7.0	12.5 ± 7.2	F=0.50	0.480
Impulsivity (BIS, mean±SD)	63.1 ± 19.5	57.2 ± 18.2	F=2.34	0.129
Aggression (Brown-Goodwin, mean±SD)	21.1 ± 5.8	20.2 ± 6.4	F=0.464	0.497
Hostility (Buss-Durkee, mean±SD)	39.4 ± 11.8	36.7 ± 12.5	F=1.18	0.279
Age at onset of abuse (years, mean±SD)	8.00 ± 4.3	8.8 ± 3.7	F=0.91	0.343
Concurrent physical abuse (%)	54.4	54.3	X^2=0.00	0.997
Role of abuser (in home or parent, %)	45.3	32.6	X^2=1.66	0.198
Severity of abuse (CARE, mean±SD)	5.5 ± 6.4	5.9 ± 5.0	F=0.08	0.767
Repeated episodes of abuse (%)	35.1	26.1	X^2=0.96	0.326
Duration of abuse (months, mean±SD)	40.4 ± 47.1	16.7 ± 30.1	F=8.09	0.005

PTSD – post-traumatic stress disorder; HAM-D – Hamilton Rating Scale for Depression; BIS – Buss-Durkee Hostility Inventory; CARE – Childhood and Adolescence Review of Experiences

between attempters and non-attempters with regards to PTSD or substance abuse. The groups did not significantly differ in severity of depression (as assessed by the HAM-17). Similarly, measures of impulsivity, aggression or hostility did not differ between attempters and non-attempters.

On average, sexual abuse occurred before age 9 for both attempters and non-attempters and frequently (54.4%) coexisted with physical abuse. The mean severity was reported between 5 and 6 (5 being "simulated intercourse over clothes" and 6 being "child masturbating abuser or involved in abuser's masturbation or simulated intercourse under clothes"). With regards to the characteristics of the abuse, suicide attempters suffered sexual abuse for a longer period than non-attempters (40.4 vs. 16.7 months; F=8.01; df=1; p=0.005). No other differences were found between suicide attempters and non-attempters in terms of age at onset of the abuse, concurrent physical abuse, role of the abuser, severity of the abuse and repetition of abuse episodes (Table 1).

Characteristics of suicide attempts

Within the suicide attempters group, the mean number of attempts was 1.4±0.49. Earlier onset of the sexual abuse (r=−.273; p=0.048) and duration of the abuse (r=.293; p=0.004) were associated with more lifetime suicide attempts. An almost significant correlation was also found between the number of abuse episodes and the number of suicide attempts (r=.259; p=0.052). The remaining characteristics of the sexual abuse showed no association with the number of suicide attempts (Table 2). We examined other

Table 2 Correlations (r) between severity of suicidal behavior and abuse characteristics

	Age at onset	Maximal duration	Maximal severity	Main abuser	Number of episodes	Physical abuse
Number of attempts	−.273 (p=0.048)	.293 (p=0.004)	.101 (p=0.456)	−.171 (p=0.222)	.259 (p=0.052)	.187 (p=0.163)
Total score (SIS)	−.382 (p=0.005)	.183 (p=0.203)	−.154 (p=0.258)	−.190 (p=0.178)	.200 (p=0.139)	.141 (p=0.302)
Age at first attempt	.135 (p=0.335)	−.038 (p=0.791)	−.298 (p=0.024)	.114 (p=0.418)	−.017 (p=0.901)	−.323 (p=0.014)
Maximal lethality	−.067 (p=0.631)	.039 (p=0.786)	.005 (p=0.973)	.056 (p=0.689)	.068 (p=0.615)	−.061 (p=0.651)

SIS – Suicide Intent Scale

Table 3 Predictors of severity of suicidal behavior

Response variable	Predictor variables	Beta	t	p
Number of suicide attempts	Age	0.09	0.00	0.99
	Sex	0.03	0.66	0.49
	Personality disorders	0.36	0.46	0.000
	Number of abuse episodes	0.14	0.10	0.30
	Duration of abuse	0.151	1.42	0.159
	Age at onset of abuse	−0.17	−0.05	0.67
Age at first suicide attempt	Sex	0.00	−0.00	0.999
	Personality disorders	−0.09	−0.71	0.483
	Severity of sexual abuse	−0.24	−1.70	0.094
	Physical abuse	−0.24	−1.73	0.090
Suicidal intent	Age	−0.25	−1.78	0.083
	Sex	0.06	0.47	0.64
	Personality disorders	−0.06	−0.44	0.66
	Age at onset of abuse	−0.37	−2.67	0.011

demographic and clinical characteristics of the sample, and identified personality disorders as correlated with the number of attempts ($r=.462$; $p<0.001$). After including personality disorders in the regression model, only those disorders, and not age at onset of sexual abuse or the number of episodes of abuse, predicted number of attempts (Table 2). Therefore, we tested the collinearity between age at onset of sexual abuse and personality disorders. Subjects with personality disorder diagnoses tended to report on average an earlier age of onset of the sexual abuse compared with the rest of the sample (7.4 vs 9.1 years respectively; $F=3.87$; $df=1$; $p=0.052$).

The more severe the sexual abuse, the earlier the first suicide attempt occurred ($r=-.298$; $p=0.024$). Similarly, the coexistence of physical abuse was significantly associated with an earlier onset of the suicide attempts ($r=-.323$; $p=0.014$). However, age of onset of the abuse was not associated with age at first suicide attempt. No other significant findings emerged. All significant associations disappeared in the regression model when controlling for personality disorders and sex; only severity of sexual abuse was marginally associated with the age at first suicide attempt (Table 3).

Only one significant correlation was found between the characteristics of the abuse and the level of suicidal intent: the earlier the age of onset of the sexual abuse, the higher the intent ($r=-.382$; $p=0.005$). This finding persisted even after controlling for age, sex and personality disorder diagnoses of the participants in the regression model (Table 3). Subjects younger than 12 years of age at the onset of sexual abuse reported greater suicidal intent than subjects older than 12 years of age ($F=8.35$; $df=1$; $p=0.006$), but no other differences in suicidal features.

The lethality of the most lethal attempt (as assessed by the Medical Damage Lethality Rating Scale) was not associated with any characteristics of the sexual abuse. Consequently, regression analyses were not performed.

DISCUSSION

Few studies have examined the effects of different characteristics of childhood abuse in relation to later suicide attempts, despite the well-known association between abuse and suicidal behavior (23,24). Yet, severe sexual abuse, such as vaginal or anal penetration in childhood, seems to be associated with higher rates of suicide ideation and attempts than are less severe sexual activities, such as molestation (6). In this study, we examined the effect of age of sexual abuse onset on characteristics of lifetime suicidal behavior. In our sample, only sexual, but not physical, abuse was associated with suicidal behavior. This finding contradicts previous evidence regarding physical abuse and suicide risk in larger samples (25), but is consistent with reports indicating a higher risk of suicide attempts after sexual abuse when compared with physical abuse (5,26). While sexual abuse seems clearly associated with increased risk for suicidal behavior independently of confounding factors, a previous study showed that the association of physical abuse and suicidal behavior could be largely explained by the socio-economic and familial context in which the abuse occurred (6).

As hypothesized, earlier onset of sexual abuse was associated with greater suicidal intent. This finding remained even when other variables, such as personality disorders, age, and sex, were controlled for. However, the age at onset of the abuse was not associated with any other of the selected markers of suicide attempt severity. That personality disorders were associated with both age at onset of abuse and lifetime number of suicide attempts, may explain why age of onset of sexual abuse was not found to be associated with the number of suicide attempts in the adjusted regression model. In agreement with the literature (11,27,28), suicidal behavior was more frequent among individuals with personality disorders. Impulsive aggression traits have been proposed as an intermediate phenotype of suicide (29), and may mediate the association of borderline personality disorder with suicidal behavior (30,31). We did not find greater scores of impulsivity, aggression or hostility among suicide attempters, but differences among the groups were not expected, since sexual abuse correlates with these measures and the whole sample was exposed to this type of abuse (19,32–34).

The mechanisms that link childhood abuse and suicidal behavior remain unknown, but it may be that the effect of childhood abuse on brain development underlies this association at least partly. A large body of developmental research has investigated the consequences of early trauma on cognitive and affective functioning. Individuals who suffered childhood maltreatment have shown decreased intellectual performance, impairments in memory and executive

functions, and deficits in areas of affective functioning, such as reward processing or emotional perception (35). Furthermore, childhood abuse may alter developmental processes related to the strengthening of emotion regulation and associated interpersonal skills (36,37). Difficulties in emotion regulation are thought to confer risk for later mental disorders (38,39), and may mediate the association of childhood trauma with child and adult psychopathology (40–43). There is also evidence that sexual abuse increases the sensitivity to subsequent depressogenic life events (44). The extent to which the psychopathology of abused individuals, which is a major risk factor for suicidal behaviors, mediates the relationship between childhood abuse and suicidal behavior is still to be determined. Cognitive impairments (45) and emotional dysregulation (46) have also been independently associated with increased suicidal behavior.

The timing of physical or sexual childhood trauma may determine the effects of traumatic experiences in the developing brain (38,47). For instance, the impact of stress reactions due to early child abuse might lead these children to be chronically stressed and overly vigilant and with atypical cortisol regulation (41,48). Earlier age at onset of abuse has also been linked with more pronounced over-generalized memory (49), a term that describes a difficulty in retrieving specific autobiographical memories, and to increased risk for PTSD (47). In our sample, the modal onset of abuse was just before age 9. Our finding that the younger the onset of the abuse, the higher the intent of attempts, is consistent with the aforementioned studies. However, more work is needed to elucidate this, as the relation between the age of onset of traumatic experiences and its consequences might not be linear. We also found that sexual abuse starting after age 12 was associated with less suicidal intent in later life. According to developmental research, brain systems undergoing growth spurts may show increased susceptibility to environmental influences (38). Andersen et al (50) reported in a female sample that, during certain periods, sexual abuse was associated with smaller hippocampal volume (at ages 3 to 5) or with dysfunctions in the corpus callosum (at ages 9 to 10) and the prefrontal cortex (at ages 11 to 14) (50). The interaction of early life stress and small hippocampal volume might also increase the risk for depression (51).

Several limitations should be considered in the present study. The relatively small sample size hampers the possibility of finding differences among the study groups, and the analyses are cross-sectional in design. Recall bias might be present, since the mean number of years from childhood abuse onset to the moment of the assessment was 31.7 ± 9.2. However, most studies in the field have also relied on retrospective records of childhood abuse, even though their use is controversial (52). If personality factors mediate the effects of childhood sexual abuse on later suicidal behaviors, including personality disorders in the model may have led to an underestimation of these effects. Puberty occurs on average between ages 12 and 13 (53), but we did not assess pubertal stage and early puberty has been associated with sexual abuse (54). Finally, other types of abuse, such as psychological and emotional abuse (55), were not considered and other moderating factors, such as parenting styles (56), may be of importance in the relationship between abuse and suicidal behavior.

In summary, our analyses reveal that, among depressed individuals, the earlier the age at onset of sexual abuse, the greater suicidal intent reported for suicide attempts. This suggests that age of onset of abuse should be considered along with the type and severity of the abuse when studying the risk for suicidal behavior in abused populations.

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